Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
Route 135, Westborough, MA 01581
tel: (508) 792-7270, ext. 200; fax: (508) 792-7821
www.state.ma.us/dfwele/dfw/nhesp

Harpoon Clubtail Dragonfly

Gomphus descriptus

State Status: **Endangered**
Federal Status: None

DESCRIPTION OF ADULT: The Harpoon Clubtail (*Gomphus descriptus*) is a large, slender insect belonging to the order Odonata, suborder Anisoptera (the dragonflies). The Harpoon Clubtail is a member of the Gomphidae family (the clubtails), one of the most diverse families of dragonflies in North America, with nearly 100 species. Clubtails are unique among the dragonflies in having eyes that are separated from each other. These insects, as their name implies, have a lateral swelling near the end of the abdomen, giving the abdomen a "club-like" appearance. The Harpoon Clubtail belongs to the sub-genus *Phanogomphus*. These clubtails are characterized by their dull coloring of grays, greens, browns and blacks, and by their small "club." Harpoon Clubtails have a plain gray-green face and eyes that range in color from pale to deep aqua blue. The sides of the thorax (winged and legged section behind the head) are marked with three wide grayish green stripes that almost completely cover the brown base color. The top of the thorax also has a base color of dark brown and is marked with two gray-green stripes. The abdomen (section behind the thorax) is black. Segments 3 through 7 (dragonflies and damselflies have 10 abdominal segments) have thin grayish green dorsal stripes that grow shorter towards the tip of the abdomen. Dorsally, segments 8 through 10 are entirely black, though they have gray-green to yellow patches on the sides. Recently emerged individuals are more brightly colored than mature individuals and can initially cause identification problems. Although the pattern is the same, the pale coloration, instead of being dull gray-green, can be bright yellow. Examination of the terminal abdominal appendages of the male and the vulvar laminae of the female (as shown in Needham *et al*. (2000) and Walker (1958)) under a microscope or magnifying lens is the most reliable method for identifying this species.

Adult Harpoon Clubtails range from about 1.8 to 1.9 inches (46 to 49 mm) in length. Although the female is similar in coloration, she is more stout than the male, with a "club" that is even smaller than the male.

SIMILAR SPECIES: Although one can fairly quickly recognize a clubtail as belonging to the sub-genus *Phanogomphus* by a combination of factors, including its coloration and small "club," members of this sub-genus can be very difficult to identify to the species level. Examination of certain anatomical features under a microscope is the most reliable way to identify the Harpoon Clubtail. Male Harpoon Clubtails are best identified by examination of the terminal abdominal appendages and hamules (organs located on the underside of segment two) as shown in Walker (1958).

Females may be identified to species by the shape of their vulvar laminae (located underneath segments eight and nine) as shown in Walker (1958).

The nymphs can be distinguished by characteristics of the labium as per the keys by Walker (1958) and Soltesz (1996).

HABITAT: The Harpoon Clubtail inhabits clear, cold streams with intermittent sections of rocks and rapids. The fast flow of these streams is interrupted here and there by pools below sections of rapids, where the aquatic nymphs burrow into the accumulated sand and gravel.

LIFE-HISTORY/BEHAVIOR: Harpoon Clubtails fly from late spring through early summer. Emergence may take place as early as late April and early May. Adults have been observed in Massachusetts during the months of May and June, though elsewhere they fly into the middle part of July. There has been very little published on the life cycle and behavior of the Harpoon Clubtail. Information published on similar species can be used to supplement our knowledge of the Harpoon Clubtail. The nymph or larvae is the first major life stage of the dragonfly following hatching from the egg. This stage of the life cycle is entirely aquatic. When the nymph is fully developed, the adult emerges from this form. The adult dragonfly is a free-flying insect that often wanders far from the water, but must return in order to breed.

HARPOON CLUBTAIL FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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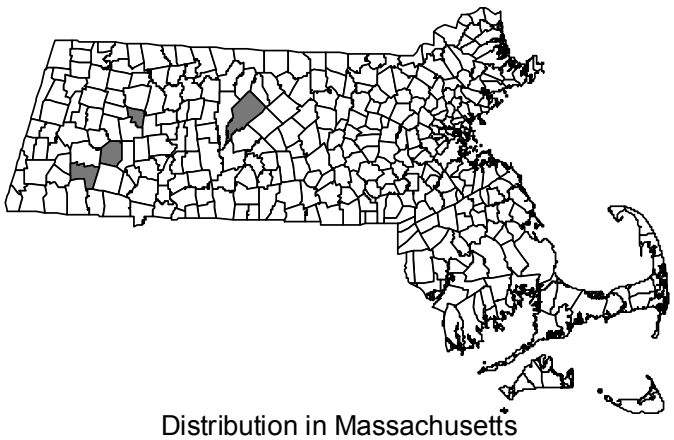
Harpoon Clubtail nymphs spend much of their time burrowing in the bottom sediment. The habit of burrowing not only provides them with protection from predators, but may also provide them with camouflage or a hiding spot from which they can capture prey. Dragonfly nymphs are voracious predators and feed on a variety of aquatic life from insects to small fish and tadpoles.

It is not known how long it takes for the nymph of the Harpoon Clubtail to fully develop. However, it takes about one year in similarly sized dragonflies. The final step before becoming a flying adult is eclosure (or emergence). This is the process by which the adults emerge from the nymphal skin (exuviae). The nymph of the Harpoon Clubtail crawls up directly onto the bank of its pool habitat or onto exposed rocks or logs to emerge. Upon finding a secure perch, usually less than a few feet above the water's surface, the adult pushes out of the exoskeleton and stretches its wings. The new adult is very soft and vulnerable at this time (called "teneral"). In the first few hours following emergence, adults can be damaged by rain showers, falling debris, and predators. As a result, the adult makes its maiden flight into the woods that surround the breeding habitat as soon as possible. Away from the water, the dragonfly can find relatively safe shelter among the leaves and branches of trees. During this time of wandering and maturation, Harpoon Clubtails can be found in fields and forest clearings, sometimes far away form the breeding site, perched horizontally on sunlit vegetation or the ground. From such perches, Harpoon Clubtails make periodic feeding forays during which they consume small aerial insects such as flies and mosquitoes. Spines on the legs of adult dragonflies aid in the capture of aerial prey. When the maturation process is complete, the adults return to the stream to breed.

In Massachusetts, the Harpoon Clubtail may begin breeding as early as the second week of May and will continue to breed throughout the month of June. Although the nymphs are found in the quiet pools below areas of rapids, the adults prefer the swifter sections of the rivers. Upon returning to the stream, male Harpoon Clubtails can be found perching on rocks in these areas or on shoreline vegetation. From exposed perches they make patrols out over the water, often returning to the same or a nearby perch. During these patrols, the males are primarily searching for mates and driving off any potential competitors. Females spend little time around the breeding habitat, except during the brief time when they are ready to mate and lay eggs.

When mating is completed, the female returns to the water in order to deposit her eggs. Female Harpoon Clubtails oviposit alone by tapping the tip of their abdomen to the surface of the water. This is usually done in the faster sections of the stream where there are rapids. The female flies rapidly back and forth over the water touching the surface of the water with the tip of her abdomen every few feet to release eggs. Upon being laid, the eggs are carried downstream from the rapids and are usually deposited in the pools where there is suitable larval habitat.

RANGE: The Harpoon Clubtail is found from Nova Scotia west to Ontario, south through the Appalachian region to North Carolina and Kentucky. In New England, the Harpoon Clubtail is found in Maine, New Hampshire and Vermont, south through western Massachusetts, and into extreme northwestern Connecticut.



Distribution in Massachusetts
1977 - 2002
Based on records in Natural Heritage Database

POPULATION STATUS IN MASSACHUSETTS: The Harpoon Clubtail is listed as an Endangered species in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc…) and sale under the Massachusetts Endangered Species Act. As with many species of Clubtails, population densities appear to be fairly low. However, this may be due to the elusiveness of the adults. Surveys focusing on the nymphs of the Harpoon Clubtail, which are easier to find than the adults, should give a more accurate representation of the species status in Massachusetts.

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact management needs of the Harpoon Clubtail are not known. Alteration of water quality is certainly a threat to the maintenance of their populations in Massachusetts. Threats to water quality include industrial pollution and sewage overflow, and salts and other run-offs from roadways. Also, as an inhabitant of lotic habitats, this species may also be particularly vulnerable to alterations in water flow by damming or other water diversion. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged and preservation of the remaining undeveloped upland bordering the river should be a top priority.

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